Amendments to the Claims

1. (Previously presented): A surgical implant suitable for use in a joint between the surfaces of two bones, comprising:

two rigid opposing shells, each having

an outer surface adapted to engage the surfaces of the bones of a joint in such a way that movement of the shell relative to the bone surface is resisted by friction between the outer surface and the surface of the bone;

an inner surface that is smoother than the outer surface; and an edge between the outer surface and the inner surface;

a deformable, resilient central body disposed between the inner surfaces of the shells comprising an outer surface, at least a portion of which has a shape that complements and articulates with the shape of the inner surface of one or both rigid opposing shells to allow the inner surface of the rigid opposing shell and the outer surface of the central body to move easily with respect to each other within a constrained range of motion, but to resist such movement outside the constrained range of motion.

2. (Original): The surgical implant of claim 1, further comprising:

a flexible sheath extending between edges of the opposing shells, having an inner surface that, together with the inner surfaces of the rigid shells, defines a cavity containing the central body.

3. (Original): The surgical implant of claim 2, further comprising:

a liquid lubricant, which occupies at least a portion of the cavity.

4. (Previously presented): A surgical implant suitable for use in a joint between the surfaces of two bones, comprising:

two rigid opposing shells, each having

an outer surface adapted to engage the surfaces of the bones of a joint in such a way that movement of the shell relative to the bone surface is resisted by friction between the outer surface and the surface of the bone;

an inner surface that is smoother than the outer surface, wherein the inner surface of at least one of the rigid opposing shells comprises a motion limiting device disposed thereon; and an edge between the outer surface and the inner surface;

a deformable, resilient central body disposed between the inner surfaces of the shells comprising an outer surface, at least a portion of which has a shape that compliments and articulates with the shape of the inner surface of one or both rigid opposing shells to allow the inner surface of the rigid opposing shell and the outer surface of the central body to move easily with respect to each other within a constrained range of motion, but to resist such movement outside the constrained range of motion.

5. (Original): The surgical implant of claim 4, wherein the motion limiting device comprises a bead or ridge formed on the inner surface.

6. (Original): The surgical implant of claim 5, wherein the bead or ridge is located at the edge of the shell, and extends toward the central body.

7. (Previously presented): The surgical implant of claim 4, wherein the surface of the central body comprises a motion limiting device disposed thereon, which contacts the motion limiting device of the shell when the implant reaches the end of an acceptable range of motion.

8. (Previously presented): The surgical implant of claim 7, wherein the motion limiting device on the central body comprises a ridge that circumscribes the area of the inner surface of the shell that contacts the outer surface of the central body.

9. (Original): The surgical implant of claim 4, wherein the motion limiting device comprises a post extending toward the deformable resilient central body, and wherein the outer surface of the central body further comprises at least one opening adapted to receive the post.

10. (Previously presented): The surgical implant of claim 1, wherein the edge of at least one of the rigid opposing shells comprises a tab extending axially away from the central body.

11. (Original): The surgical implant of claim 10, wherein the tab is adapted to releasably receive a tool for manipulating, inserting or removing the implant.

12. (Original): The surgical implant of claim 11, wherein the edges of both rigid opposing shells comprise a tab.

13. (Original): The surgical implant of claim 1, wherein the outer surface of each rigid opposing shell is cooled with a biocompatible porous coating.

14. (Original): The surgical implant of claim 13, wherein the porous coating comprises nonspherical sintered beads of a biocompatible metal or metal alloy.

15. (Original): The surgical implant of claim 14, wherein the rigid shell comprises a titanium alloy and wherein the porous coating comprises nonspherical sintered titanium beads.

16. (Previously presented): A surgical implant suitable for use in a joint between the surfaces of two bones, comprising:

two rigid opposing shells, each having

an outer surface adapted to engage the surfaces of the bones of a joint in such a way that movement of the shell relative to the bone surface is resisted by friction between the outer surface and the surface of the bone;

an inner surface that is smoother than the outer surface; and an edge between the outer surface and the inner surface;

wherein at least one of the rigid opposing shells further comprises a closable passage between its outer surface and its inner surface;

a deformable, resilient central body disposed between the inner surfaces of the shells comprising an outer surface, at least a portion of which has a shape that compliments and articulates with the shape of the inner surface of one or both rigid opposing shells to allow the inner surface of the rigid opposing shell and the outer surface of the central body to move easily with respect to each other within a constrained range of motion, but to resist such movement outside the constrained range of motion.

17. (Original): The surgical implant of claim 16, wherein the closable passage comprises a hole that is closable by insertion of a correspondingly sized plug.

18. (Previously presented): A surgical implant suitable for use in a joint between the surfaces of two bones, comprising:

two rigid opposing shells, each having

an outer surface adapted to engage the surfaces of the bones of a joint in such a way that movement of the shell relative to the bone surface is resisted by friction between the outer surface and the surface of the bone;

an inner surface that is smoother than the outer surface; and an edge between the outer surface and the inner surface;

wherein the edge between the outer surface and the inner surface of the rigid opposing shells comprises a circumferential groove adapted to receive a retaining ring~~,~~;

a deformable, resilient central body disposed between the inner surfaces of the shells comprising an outer surface, at least a portion of which has a shape that compliments and articulates with the shape of the inner surface of one or both rigid opposing shells to allow the inner surface of the rigid opposing shell and the outer surface of the central

body to move easily with respect to each other within a constrained range of motion, but to resist such movement outside the constrained range of motion;

a flexible sheath extending between edges of the opposing shells, having an inner surface that, together with the inner surfaces of the rigid shells, defines a cavity containing the central body.

19. (Original): The surgical implant of claim 18, wherein the sheath overlaps the circumferential groove and is held against the edge of the rigid opposing shells by the retaining ring.

20. (Original): The surgical implant of claim 9, wherein the implant is a vertebral endoprosthesis.

21. (Previously presented): A vertebral endoprosthesis, comprising:

an upper and a lower rigid, opposed, biocompatible shell, each comprising:

an outer, rough surface;

an inner, smooth concave surface; and

an edge between the surfaces;

wherein the inner smooth surface of at least one of the shells comprises a motion limiting device; and

a deformable, resilient central body disposed between the inner, smooth concave surfaces of the upper and lower shells, comprising:

a smooth convex upper surface adjacent to the inner smooth concave surface of the upper shell and a smooth convex lower surface adjacent to the inner smooth concave surface of the lower shell; and

a motion limiting device disposed on at least one of the smooth convex upper and lower surfaces adapted to contact the motion limiting device of the inner surface and limit the relative motion of the shell with respect to the central body.

22. (Original): The vertebral endoprosthesis of claim 21, further comprising:

an elastic sheath disposed between the upper and lower shells and external to the central body, comprising an inner surface, an outer surface, an upper edge attached to the upper shell, and a lower edge attached to the lower shell; wherein the inner surface of the sheath and the inner surfaces of the shells define an enclosed cavity.

23. (Original): The vertebral endoprosthesis of claim 22, further comprising a lubricant disposed within the enclosed cavity.

24. (Original): The vertebral endoprosthesis of claim 21, wherein the motion limiting device on the shell comprises a first ridge disposed on the inner surface of the shell, and the motion limiting device on the central body comprises a shoulder disposed on the surface of the central body.

25. (Original): The vertebral endoprosthesis of claim 24, wherein the first ridge comprises an axial extension of at least a portion of the edge of the shell toward the central body, and circumscribes the area of the inner surface that can contact the smooth convex surface of the central body.

26. (Original): The vertebral endoprosthesis of claim 24, wherein the shoulder circumscribes the convex surface of the central body.

27. (Original): The vertebral endoprosthesis of claim 21, wherein the outer surface of the shell is convex.

28. (Original): The vertebral endoprosthesis of claim 21, wherein the outer surface of the shell comprises a porous biocompatible coating.

29. (Original): The vertebral endoprosthesis of claim 28, wherein the porous biocompatible

coating comprises nonspherical sintered beads of a biocompatible metal.

30. (Previously presented): The vertebral endoprosthesis of claim 21, wherein the edge of at least one of the shells comprises a circumferential groove adapted to be overlapped by a sheath and to receive a retaining ring securing the sheath to the shell.

31. (Original): The vertebral endoprosthesis of claim 30, further comprising a retaining ring disposed in the circumferential groove, and compressing the edge of the sheath into the groove.

32. (Original): The vertebral endoprosthesis of claim 31, wherein the retaining ring comprises a wire or filament of biocompatible material, formed into a ring.

33. (Original): The vertebral endoprosthesis of claim 32, wherein the ends of the ring are laser welded.

34. (Original): The vertebral endoprosthesis of claim 21, wherein the edge of at least one of the shells comprises an tab extending axially away from the central body.

35. (Original): The vertebral endoprosthesis of claim 34, wherein the tab is adapted to releasably engage a tool for manipulating or inserting the endoprosthesis.

36. (Original): The vertebral endoprosthesis of claim 35, wherein the tab comprises an opening to releasably receive a retaining prong of the tool.

37. (Original): The vertebral endoprosthesis of claim 21, wherein the inner surface of at least one shell comprises a post extending toward the central body, and wherein the outer surface of the central body comprises at least one opening adapted to receive the post.

38. (Original): The vertebral endoprosthesis of claim 21, wherein at least one of the shells further comprises a closable passage between its outer surface and its inner surface.

39. (Original): The vertebral endoprosthesis of claim 38, wherein the closable passage comprises a hole that is closable by insertion of a correspondingly sized plug.

40. (Original): The vertebral endoprosthesis of claim 39, wherein the hole and plug are threaded with complementary threads.

41. (Original): A vertebral endoprosthesis, comprising:

an upper and a lower rigid, opposed biocompatible concavo-convex shell, each comprising:

an outer, rough convex surface, comprising a porous coating of a biocompatible material;

an inner concave surface, comprising:

a smooth contact area; and

an axial post extending toward the opposing shell; and

an edge between the surfaces, comprising:

a circumferential groove adapted to receive a retaining ring; a first ridge circumscribing the contact area of the inner concave surface and extending axially toward the opposing shell;

a tab extending axially away from the opposing shell, and comprising an opening adapted to releasably engage a tool for manipulating, inserting, or removing the endoprosthesis;

a closable passage between the outer surface and the inner surface of the shell;

a deformable, resilient central body disposed between the inner, smooth concave surfaces of the upper and lower shells, comprising:

smooth convex upper and lower surfaces complementary and adjacent to the smooth contact area of the inner surfaces of the respective upper and lower shells;

a shoulder circumscribing each of the smooth convex upper and lower surfaces and adapted to contact the first ridge of the adjacent shell and limit the relative motion of the shell with respect to the central body; a laterally extending equatorial ridge disposed between the first ridge of the upper concavo-convex shell and the first ridge of the lower concavo-convex shell;

an opening in the upper and lower convex contact surfaces adapted to receive the axial post of the inner surface of each shell;

an elastic sheath disposed between the upper and lower shells and external to the central body, comprising an inner surface, an outer surface, an upper edge attached to the upper shell, and a lower edge attached to the lower shell, wherein the inner surface of the sheath and the inner surfaces of the shells define an enclosed cavity;

an upper retaining ring of a biocompatible material disposed in the circumferential groove in the upper concavo-convex shell and securing the upper edge of the elastic sheath to the shell and a lower retaining ring of a biocompatible material disposed in the circumferential groove of the lower concavo-convex shell and securing the lower edge of the sheath to the shell.

42. (Original): The vertebral endoprosthesis of claim 41, further comprising:

a plug of biocompatible material disposed in the closable passages between the outer surface and inner surface of at least one of the concavo-convex shells.

43. (Original): The vertebral endoprosthesis of claim 42, further comprising:

a lubricant disposed within the implant cavity.

44. (Original): The vertebral endoprosthesis of claim 43, wherein a plug is disposed in the closable passage of each concavo-convex shell.

45-55 (Cancelled)

56. (Previously presented): A bone joint implant comprising a central body positioned between two shells, wherein the central body has an upper and a lower contact surface, wherein an upper shoulder is recessed into a portion of the perimeter of the upper contact surface and a lower shoulder is recessed into a portion of the perimeter of the lower contact surface.

57. (Original): The implant of claim 56 wherein the central body has at least one convex contact surface.

58. (Original): The implant of claim 57 wherein the central body has an upper and a lower convex contact surface.

59. (Original): A bone joint implant comprising an encapsulated central body having an upper and a lower contact surface, wherein an upper shoulder extends around a portion of the perimeter of the upper contact surface and a lower shoulder extends around a portion of the perimeter of the lower contact surface.

60. (Original): The implant of claim 59 wherein the central body has at least one convex contact surface.

61. (Original): The implant of claim 60 wherein the central body has an upper and a lower convex contact surface.

62-63. (Cancelled)

64. (Currently amended): A bone joint implant comprising a central body positioned between two shells, wherein each shell has a ~~machined~~ relatively smooth inner surface that contacts the central body and at least one shell has a centralized motion constraint protuberance.

65. (Original): The implant of claim 64 wherein the inner surface is shaped to articulate with at least a portion of the central body.

66. (Previously presented): The endoprosthesis of claim 41 wherein the outer porous coating of biocompatible material is disposed to promote bony ingrowth.

67. (Previously presented): The endoprosthesis of claim 41 wherein the outer porous coating of biocompatible material is formed by vacuum sintering.

68. (Cancelled)

69. (Previously presented): A bone joint implant comprising a central body positioned between two shells, wherein at least one shell has an outer surface that is coated to promote bony ingrowth, and wherein the coating is a nonspherical sintered bead coating.

70. (Previously presented): The endoprosthesis of claim 41 wherein the outer porous coating is a titanium coating.

71. (Previously presented): The implant of claim 70 wherein the outer porous, titanium coating meets ASTM F-67.

72. (Cancelled): A bone joint implant comprising a central body positioned between two shells,

wherein at least one shell has a rough outer surface that is not teeth-shaped.

73. (Cancelled): A bone joint implant comprising a central body positioned between two shells, wherein at least one shell has an outer surface that is coated to provide friction between the outer surface and bone.

74. (Currently Amended): A bone joint implant comprising at least two opposing shells, a central body disposed between the two opposing shells, and at least one sealable opening ~~a lubricant encapsulated within a structure having at least one sealable opening~~ for the introduction of ~~the~~ a lubricant into the ~~structure~~ implant after the implant has been assembled.

75. (Previously presented): A bone joint implant comprising a central body and a lubricant encapsulated within a structure having at least one opening for the introduction of the lubricant into the structure, wherein the structure includes two shells and a sleeve extending between the shells, and the opening is included in at least one of the shells.

76. (Original): The implant of claim 75 wherein both shells include openings.

77-80. (Cancelled)

81. (Previously presented): A bone joint implant comprising a central body positioned between two shells, wherein at least one shell has a first edge that includes a radial stop extending generally axially from a portion thereof, wherein the first edge has an outer circumferential groove therein.

82. (Previously presented): The implant of claim 81 wherein the radial stop extends generally axially a distance of less than about 2.5 mm from the edge.

83. (Previously presented): The implant of claim 81 wherein the radial stop is adapted to contact a shoulder formed in the central body when translational, flexural, or extensional forces are applied to the implant.

84. (Previously presented): The implant of claim 81 wherein at least one shell has an edge that includes a tab extending generally axially from a portion thereof.

85. (Previously presented): A bone joint implant comprising a central body positioned between two shells, wherein at least one shell has an edge that includes a radial stop extending generally axially from a portion thereof, at least one shell has an edge that includes a tab extending generally axially from a portion thereof, and the radial stop and the tab are on the same shell and they extend from the shell in opposite directions.

86. (Original): A bone joint implant comprising a two shells interconnected by a sleeve to form a cavity therein, and a central body having at least one indentation therein positioned within the cavity, wherein at least one of the shells includes a retaining post that extends into the indentation and at least one of the shells includes an opening to allow introduction of a lubricant into the cavity.

87. (Original): The implant of claim 86 wherein both shells include openings.

88. (Original): The implant of claim 86 wherein the opening is adapted to being sealed with a plug tool having a handle and a detachable integral plug associated therewith.

89. (Original): The implant of claim 88 wherein the plug is adapted to detach from the tool when a predetermined torque has been reached during insertion of the plug into the opening.

90. (Original): A method of introducing the lubricant into the implant of 86 comprising slightly

compressing the implant to remove excess air, and injecting the lubricant into the opening.

91. (Original): A method of introducing the lubricant into the implant of claim 87 comprising: (1) sealing one of the openings, (2) slightly compressing the implant to remove excess air, (3) injecting the lubricant into the unsealed opening, and (4) sealing the second opening.

92. (Original): The method of claim 91 wherein the openings in the shells are sealed using a seal plug tool having a segment designed to disengage at a predetermined torque.

93. (Original): A bone joint implant comprising an elastomeric central body positioned between two shells wherein the central body is impregnated with a surface hardening substance.

94. (Original): A bone joint implant comprising an encapsulated elastomeric central body that is impregnated with a surface hardening substance.

95. (Original): A bone joint implant comprising an encapsulated central body that is impregnated with a surface lubricity increasing material.

96. (Original): A bone joint implant comprising a central body positioned between two shells, wherein the central body is impregnated with a surface lubricity increasing material.

97-100. (Cancelled)

101. (Currently amended): A motion-preserving bone joint implant comprising ~~an elastomeric~~ a central body having a resilient, deformable portion and a coating thereon wherein the resilient, deformable portion allows motion in the joint implant and the coating material has a different hardness from the ~~material used to form the central body~~ resilient, deformable portion.

102. (Currently amended): The implant of claim 101, wherein the coating increases the surface hardness of the ~~elastomeric~~ central body.

103. (Currently amended): A motion-preserving bone joint implant comprising ~~an elastomeric~~ a central body having a resilient, deformable portion and a coating thereon, wherein the coating increases the surface lubricity of the central body.

104-105. (Cancelled)

106. (Previously presented): A bone joint implant comprising a central body positioned between two shells, wherein the central body has a polymer coating thereon, and the polymer is a slightly elastomeric biocompatible polymeric material.

107. (Previously presented): A bone joint implant comprising a central body positioned between two shells, wherein the central body has a polymer coating thereon, and the polymer is selected from the group consisting of Chronothane, Chronoflex, Elast-Eon II, Bionate, CarboSil-10, Tecothane, Tecoflex, and Carbothane.

108. (Previously presented): A bone joint implant comprising a central body positioned between two shells, wherein the central body has a polymer coating thereon, and the coating thickness is greater than about 1 mil.

109. (Original): The implant of claim 108 wherein the coating thickness is from about 2 mil to about 5 mil.

110. (Previously presented): A bone joint implant comprising a central body positioned between two shells, wherein the central body has a polymer coating thereon, and the coating is placed on the central body by dip coating.

111. (Cancelled)

112. (Original): A bone joint implant comprising a central body having a coating thereon characterized in that the coating material is the same as the material used to form the central body.

113. (Previously presented): The implant of claim 112 wherein the coating material has a different hardness from the material used to form the central body.

114. (Previously presented): A system of bone joint implants of varying sizes, wherein each implant comprises:

a central body positioned between an upper shell and a lower shell, wherein at least a portion of an outer surface of each shell is convex and at least a portion of an inner surface of each shell is concave; and

the convex portion of the outer surface and the concave portion of the inner surface of the shells can each be described as a quadric surface, such that 2 x 2 a 2 + y 2 b 2 + z 2 c 2 = 1 wherein (.+-.a,0,0), (0,.+-.b,0), and (0,0,.+-.c) represent the x, y, and z intercepts of the surface, respectively, and may be the same or different for the outer and inner surfaces.

115. (Original): The system of bone joint implants of claim 114 wherein a is about 11 mm.

116. (Original): The system of bone joint implants of claim 114 wherein b is about 30 mm.

117. (Original): The system of bone joint implants of claim 114 wherein c is about 10 mm.

118. (Previously presented): The system of bone joint implants of claim 114 wherein a is about 11 mm, b is about 30 mm, and c is about 10 mm.

119. (Previously presented): The system of bone joint implants of claim 114, wherein a, b and c are the same for the outer and inner surfaces.

120. (Previously presented): The implant of claim 81 wherein at least one shell has a second edge having an outer circumferential groove therein.

121. (New): The implant of claim 101 wherein the resilient, deformable portion is elastomeric.

122. (New): The implant of claim 103 wherein the resilient, deformable portion is elastomeric.